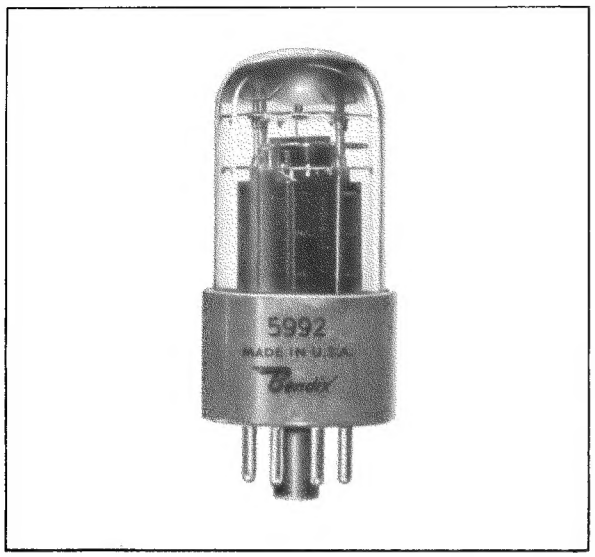
5992
Bendix Type TE-8
(Generic Type 6V6)

BEAM POWER AMPLIFIER



DESCRIPTION

This beam power amplifier is from the Bendix Red Bank line of reliable vacuum tubes. It is specifically designed to replace the 6V6 for aircraft and industrial applications where freedom from early failure, long average service life, and uniform operating characteristics are extremely important. Each tube is given a 45-hour run-in under various overload, vibration, and shock conditions likely to be encountered in service. This run-in serves to reduce early failures by eliminating tubes with any minor defects that might lead to failure under actual operating conditions.

The use of a coil type heater inside an extruded alumina insulator gives a long life heater structure which stands up well under high heater to cathode voltage. The short mount, the heavy side rods on the grids, and the multiple supports on the cage give an improved structure which maintains rigidity under shock and vibration. The tube requires an 8-pin octal socket and can be mounted in any position.

ELECTRICAL RATINGS*

Heater voltage—(AC or DC)**	6.3 volts
Heater current	0.6 amps
Plate voltage—(max.)	300 volts
Screen voltage—(max.)	275 volts
Peak plate voltage—(max. instantaneous)	600 volts
Plate dissipation—(max.)***	12 watts
Screen dissipation—(max.)***	2 watts
Max. heater-cathode voltage	350 volts
Max. grid resistance	0.1 megohm
Warm-up time	45 sec.

(Plate and heater voltage may be applied simultaneously)

* To obtain greatest life expectancy from tube, avoid designs where the tube is subjected to all maximum ratings simultaneously.

** Voltage should not fluctuate more than ± 5%.

*** See chart on other side.

PHYSICAL CHARACTERISTICS

Base	Intermediate shell octal 8-pin (Melamine—with barriers)
Bulb	T-9
Max. overall length	3.320 in.
Max. seated height	2.820 in.
Max. diameter	1.320 in.
Mounting position	Any
Max. altitude (See chart on page 3)	80,000 ft.
Max. bulb temperature	180°C.
Life expectancy	10,000 hours

TYPICAL OPERATION

SINGLE-TUBE, CLASS A_1 AMPLIFIER

Plate voltage, volts	180	250	300
Screen voltage, volts	180	250	250
Grid voltage, volts	—8.5	—12.5	—15.0
Peak A-F grid voltage, volts	8.5	12.5	15.0
Zero signal plate current, mA	29	45	34
Max. signal plate current, mA	30	47	35
Zero signal screen current, mA	3.0	4.5	3.0
Max. signal screen current, mA	4.0	7.0	6.0
Plate resistance, ohms	55,000	45,000	55,000
Transconductance, μmhos	3,500	4,000	3,500
Load resistance, ohms	5,500	5,000	6,000
Total harmonic distortion, per cent	8	8	12
Max. signal power output, watts	2.0	4.0	4.5

TYPICAL OPERATION

PUSH-PULL, CLASS AB_1 AMPLIFIER

(Values given are for two tubes)

Plate voltage, volts	250	275
Screen voltage, volts	250	275
Grid voltage, volts	—15	—19
Peak A-F grid-to-grid voltage, volts	30	38
Zero signal plate current, mA	70	70
Max. signal plate current, mA	79	92
Zero signal screen current, mA	5	4
Max. signal screen current, mA	13	13.5
Effective load resistance, ohms (plate-to-plate)	10,000	8,000
Total harmonic distortion, per cent	5	3.5
Max. signal power output, watts	10	14

THE Bendix CORPORATION
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ELECTRICAL CHARACTERISTICS AND TEST DATA

TEST CONDITIONS AND CHARACTERISTIC LIMITS

All Tubes are Stabilized for 45 Hours Under Test Conditions and 2 G Vibration at 30 cps prior to 100% Testing.

CHARACTERISTIC	SYMBOL	MIN.	DESIGN CENTER	MAX.	UNITS
PRODUCTION TESTS					
Short and Continuity					
Heater Current	If	550	600	650	mA
Heater-Cathode Leakage	Ihk	—	—	± 25	uAdc
Grid Current	Ic1	—	—	-1.0	uAdc
Plate Current	Ib	32	45	57	mAdc
Screen Current	Ic2	0	3.5	6.5	mAdc
Transconductance	Sm	3200	4000	5500	umhos
Trans. Ef = 5.7 V	Sm	—	—	15%	
Power Output	Po	3.0	—	—	watts
Cut Off Plate Current (Ec1 = 60 Vdc)	Ib			200	uAdc
A. F. Noise				17	VU
DESIGN TESTS					
Vibration 30 cps. 2.5 G Ec1 = — 25 Vdc Rp = 2,000 ohms Eb = Ec2 = 250 Vdc	Ep	—	—	150	mVac
Grid Emission Test Ef = 7.0 V; Eb = 300; Ec2 = 275; Ec1 = — 12.5 Time = 2 minutes	Ic1			— 2.0	uAdc

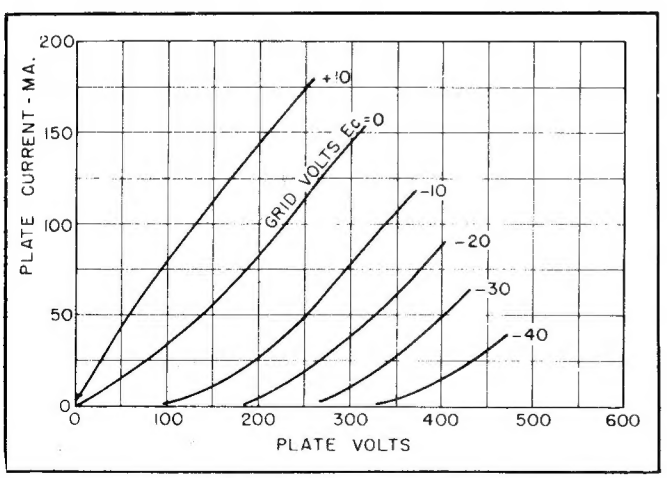
ELECTRODE.	Ef	Eb	Ec2	Ec1	Ehk
TEST CONDITIONS:	6.3 volts	250 Vdc	250 Vdc	— 12.5 Vdc	± 250 Vdc

SPECIAL TESTS*

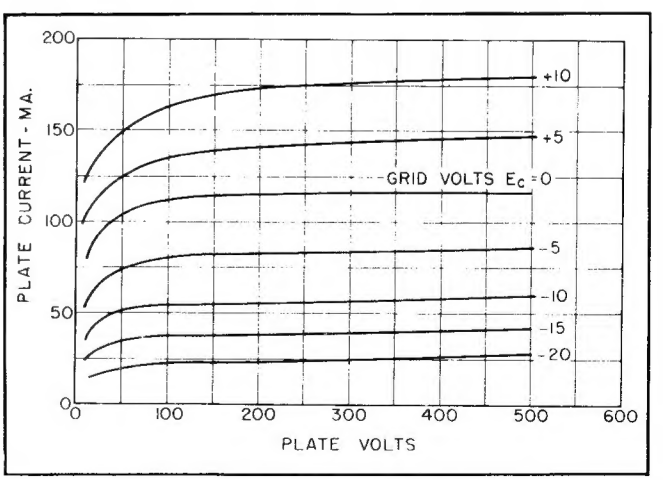
In addition to the production and design tests shown, other tests are performed on a sampling basis to assure a high outgoing quality level. See below.

TEST	CONDITIONS	DURATION
Heater Cycling Life Test	On 2½ Min. Off 2½ Min. Ef = 7.0 Ehk = 300	3,000 On-Off Cycles
Intermittent Life Test	Under "Test Conditions"	1,000 Hours
Life "Expectancy" Test	Under "Test Conditions"	5,000 Hours
High Level Fatigue Test	50G—Shock Excitation 18 Cycles/Sec.	100 Hours
Shock	500 G	20 Impacts
Altitude Test	80,000 Feet	5 Minutes
Glass Strain Test	Boiling Water to Ice Water	3 Minutes in Each
Mount Inspection	100% Test—Microscopic Inspection of 30 Possible Trouble Points	

*For additional specifications consult MIL-E-1/201 specification for the 5992.



AVERAGE PLATE CHARACTERISTICS
TRIODE CONNECTION
E_f = 6.3 VOLTS



AVERAGE PLATE CHARACTERISTICS
PENTODE CONNECTION
E_f = 6.3 VOLTS SCREEN = 250 VOLTS

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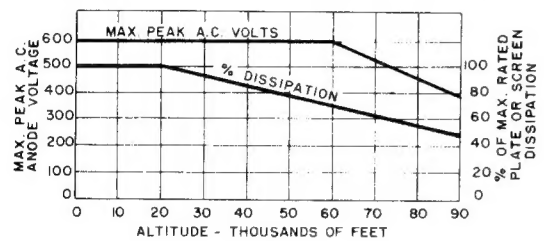
EFFECT ON LIFE OF INCREASED RATINGS

See also Application Notes	OPERATING CONDITIONS		
RATING OR CHARACTERISTIC	CONSERVATIVE	TYPICAL	MAXIMUM
Heater Voltage	6.3 V ± 2%	6.3 V ± 5%	6.3 V ± 10%
Plate Voltage	250 Vdc	300 Vdc	300 Vdc
Screen Voltage	200 Vdc	250 Vdc	275 Vdc
Peak Plate Voltage	400 v	500 v	600 v
Plate Current (Av.)	25 mA	35 mA	40 mA
Screen Current (Av.)	3 mA	4 mA	6 mA
Cathode Current (Peak)	50 mA	65 mA	100 mA
H-K Voltage	200 V	300 V	350 V
Grid Resistance	25,000 ohms	75,000 ohms	100,000 ohms
Bulb Temperature	120°C	140°C	180°C
Altitude	0-20,000′	60,000′	80,000′
Vibration	1 G	2½ G	5 G
LIFE EXPECTANCY	MAXIMUM	HIGH	MEDIUM



THIS CHART IS INCLUDED AS AN ILLUSTRATION OF THE AMOUNT OF DISSIPATION DERATING NECESSARY IN A SPECIFIC APPLICATION TO AVOID EXCEEDING THE MAXIMUM BULB TEMPERATURE. EACH APPLICATION SHOULD BE CHECKED TO DETERMINE THAT THE MAXIMUM BULB TEMPERATURE IS NOT EXCEEDED. EITHER DERATING OR COOLING OR BOTH MAY BE NECESSARY.

CRITERIA FOR DERATINGS FOLLOWS:

1. VOLTAGE DERATING - TO KEEP BELOW BASE PIN ARC OVER POINT.
2. DISSIPATION DERATING - TO KEEP BULB TEMPERATURE BELOW MAXIMUM RATING.

ALTITUDE RATINGS

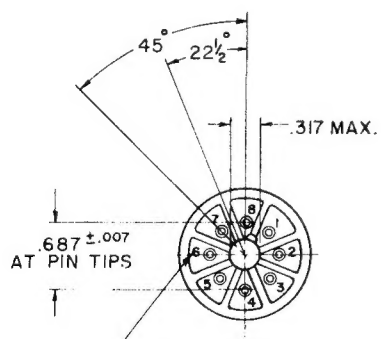
APPLICATION NOTES

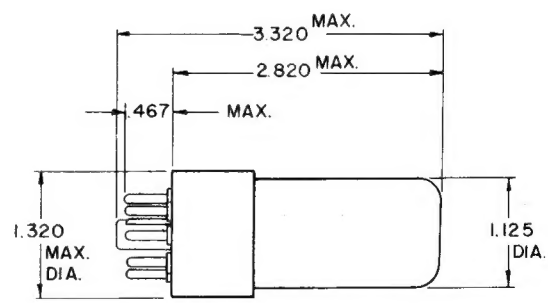
Special attention should be given to the temperatures at which the tubes are to be operated. Reliability will be seriously impaired if maximum bulb temperature is exceeded. The life expectancy will be reduced if conditions other than those specified for life test are imposed on the tube and will be reduced appreciably if absolute maximum ratings are exceeded. Both reliability and performance will be jeopardized if filament voltage ratings are exceeded. Life and reliability of performance are directly related to the degree that regulation of the heater voltage is maintained at its center rated value.

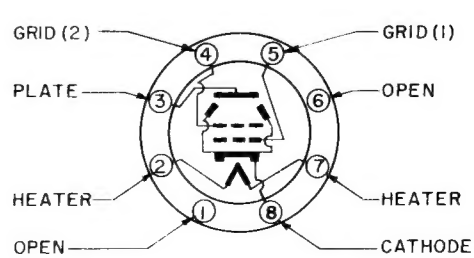
The altitude rating chart shows the correct voltage derating necessary for various altitudes. However, the dissipation derating is only approximate and must be measured for each application because of the additive effects mentioned above.

When used with A.C. on plate and screen with an inductive load such as in servo discriminator circuits, sufficient unshunted resistance in series with the screen should be used to avoid damage to the tube during that portion of the cycle when the plate may be negative with respect to the screen.

The increased rating chart is presented to emphasize the dangers of operating simultaneously at or near all maxima. In general, the effect on life of operation at increased ratings is additive and cumulative. Interpolation within this chart will give the designer a general idea of the life expectancy and reliability of his application. Each proposed application should be life tested under maximum environmental conditions in order to check that the design gives the desired reliability. When conservatively used this tube has a life expectancy of 10,000 hours.







BASE DIAGRAM
(BOTTOM VIEW)

NOTE :
DO NOT MAKE CONNECTIONS TO UNUSED PINS.

OUTLINE DRAWING

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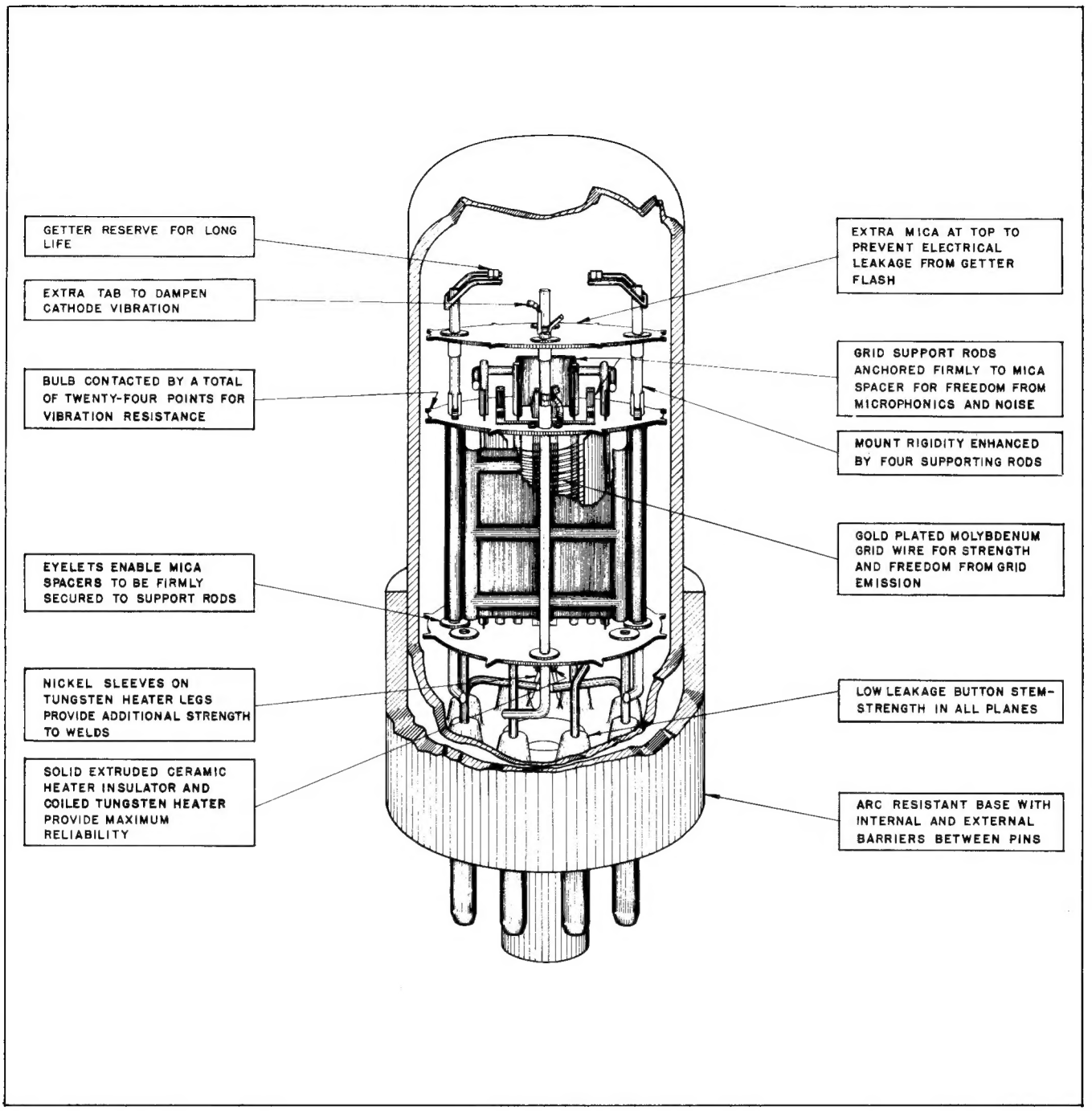

STRUCTURAL FEATURES OF 5992 PROVIDE HIGH RELIABILITY AND LONG LIFE

THE Bendix CORPORATION

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